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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/744,701	01/29/2001	Toru Tatsumi	NECW 18.281	3273
26304	7590	04/29/2004	EXAMINER	
KATTEN MUCHIN ZAVIS ROSENMAN 575 MADISON AVENUE NEW YORK, NY 10022-2585			TSAI, H JEY	
			ART UNIT	PAPER NUMBER
			2812	

DATE MAILED: 04/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 09/744,701	<b>Applicant(s)</b> TATSUMI ET	
	<b>Examiner</b> H.Jey Tsai	<b>Art Unit</b> 2812	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 18 January 2004.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 47-56 and 118-121 is/are pending in the application.
- 4a) Of the above claim(s) 1-46 and 57-117 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 47-56 and 118-121 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 January 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
     a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

***Election/Restriction***

Applicant's election of claims 47-56 and 118-121 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

This application contains claims drawn to an invention nonelected. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 47-49 and 118-120 are rejected under 35 U.S.C. § 102(b) as being anticipated by Kajita et al. 5,953,634, newly cited.

Kajita discloses a method of forming a metal oxide layer the semiconductor substrate by a *thermal CVD method*, which includes:

introducing metal organic material (reactive) and oxidizing gas (oxygen) into chamber through separate gas inlet, see col. 17, lines 40+, col. 41, lines 23+, col. 10, lines 13-25, col. 42, lines 22+, also see figs. 14 and 6

heating substrate (200 °C and maintaining the total pressure of vacuum chamber at less than  $1 \times 10^{-4}$  Pa ( $< 1 \times 10^{-2}$  torr).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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Claims 47-56 and 118-121 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yuuki et al. 5,776,254, newly cited, in view of Kajita et al. 5,953,634, newly cited and Eguchi et al. 5,618,761 and Moise et al. 6,211,035, both are previously applied.

The reference(s) teach the features :

Yuuki et al. substantially discloses a method of forming a metal oxide layer with thermal CVD, which includes:

introducing metal organic material (reactive) and oxidizing gas (oxygen) into chamber through separate gas inlet, 10 and 13, respectively, see col. 12, lines 39+, col. 15, lines 45+ also see figs. 8-12,

heating substrate (200 °C and maintaining the total pressure of vacuum chamber at less than 1.5 torr), col. 13, lines 15+, col. 16, lines 35+, col. 5, lines 45+.

The difference between the reference(s) and the claims are as follows: Yuuki teaches forming BST metal oxide film with vapor phase deposition having separate gas inlet and oxidant gas but does not teaches that the gas pressure is less than  $1 \times 10^{-2}$  torr and using an oxidant of nitrogen dioxide. However, Kajita teaches at col. 17, lines 40+, the reaction chamber pressure is lower than  $1 \times 10^{-2}$  torr ( $1 \times 10^{-4}$  Pa) and deposition method is a thermal CVD (without plasma) and Eguchi et al. teaches at that col. 3, lines 38+, col. 5, lines 45+, col. 6, lines 8+, col. 9, line 53+, col. 12, lines 50+ and col. 14, lines 30+, forming a PZT film with  $\text{ABO}_3$  crystalline structure with organic metal gas source and nitrogen dioxide oxidant and platinum bottom electrode with reactive chamber pressure at 400 torr or less (col. 6, lines 58+). And, Moise et al. teaches at col. 6, lines 19+, forming aluminum metal wiring layer 348.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the above references' teachings with a BST or PZT metal oxide film and using nitrogen dioxide as oxidant at pressure lower than  $1 \times 10^{-2}$  torr and recognized Yuuki's process is a thermal CVD process as taught by Kajita et al. because the process is not a plasma process. And, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the above references' teachings with forming aluminum wiring layer as taught by Eguchi and Moise because PZT metal oxide can be used to form a non-volatile memory device and nitrogen dioxide is not as reactive as oxygen and using aluminum for interconnection with the semiconductor chip.

Claims 50-56 and 121 are rejected under 35 U.S.C 103 as being unpatentable over Kajita et al. as applied to claims 47-49 and 118-120 above, and further in view of Eguchi et al. 5,618,761 and Moise et al. 6,211,035, both are previously applied.

The difference between the references applied above and the instant claim(s) is: Kajita et al. teaches forming metal oxide layer with organic metal source and oxygen oxidant but does not

teaches that forming a metal oxide film of PZT film and using an oxidant of nitrogen dioxide. However, Eguchi et al. teaches at that col. 3, lines 38+, col. 5, lines 45+, col. 6, lines 8+, col. 9, line 53+, col. 12, lines 50+ and col. 14, lines 30+, forming a PZT film with  $ABO_3$  crystalline structure with organic metal gas source and nitrogen dioxide oxidant with reactive chamber pressure at 400 torr or less (col. 6, lines 58+) and a platinum bottom electrode. And, Moise et al. teaches at col. 6, lines 19+, forming aluminum metal wiring layer 348.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the above references' teachings with a PZT metal oxide film and using nitrogen dioxide as oxidant and forming aluminum wiring layer as taught by Eguchi and Moise because PZT metal oxide can be used to form a non-volatile memory device and nitrogen dioxide is not as reactive as oxygen and using aluminum for interconnection with the semiconductor chip.

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Applicant's arguments filed Jan. 18, 2004 and Sept. 17, 2003 have been fully considered but they are not persuasive. Applicants contend that Greenwald reference lack a vapor phase growth (thermal CVD) by using separate introduction inlets for introducing the organometal gases and an oxidizing gas into a vacuum chamber of less than  $1 \times 10^{-2}$  torr. This is not found persuasive because newly cited references Kajita et al. and Yuuki et al. both teach vapor phase growth (thermal CVD) as set forth above. And, previously cited reference Eguchi et al. also teaches vapor phase deposition (without plasma) at col. 16, lines 45+ and fig. 17, using two separate gas inlets in the front stage of reaction chamber 602 (hence mixer is a part of reaction chamber 602) for organometal gas and oxidant gas, and at col. 6, lines 55+, deposition pressure can be lower than 400 torr (that  $1 \times 10^{-2}$  torr).

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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**Any inquiry of a general nature or clerical matters or relating to the status of this application or proceeding should be directed to the Group customer service whose telephone number is (703) 306-3329 and Fax number (703) 872-9306. Group receptionist telephone number 703-308-0956.**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to H. Jey Tsai whose telephone number is (571) 272-1684. The examiner can normally be reached on from 7:00 Am to 4:00 Pm., Monday thru Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Niebling can be reached on (571) 272-1679. The fax phone number for this Group is (703) 872-9306.

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hjt

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A handwritten signature in black ink, appearing to read 'H. Jey Tsai', with a stylized flourish at the end.

H. Jey Tsai  
Primary Examiner  
Patent Examining Group 2800